

APOLLO PROGRAM DIRECTIVE NO. 19

TO : DISTRIBUTION

FROM:

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SUBJECT: Apollo Flight Evaluation Requirements

- REFERENCES:
- (a) Apollo Test Requirements, NPC 500-10
 - (b) Apollo Reliability and Quality Assurance Program Plan, NHB 5300.1
 - (c) Apollo Program Directive No. 8
 - (d) Apollo Program Directive No. 7
 - (e) Apollo Mission Failure Contingency Plan

I. PURPOSE

This Directive establishes Apollo Flight Evaluation Requirements to ensure that maximum use is made of the flight test results to enhance future flight mission success.

II. SCOPE

The scope of the Apollo Flight Evaluation Requirements described herein covers the requirements for:

- A. Center flight evaluation reports and presentations and their contents.
- B. The identification of all significant flight and launch active ground support hardware failures and anomalies.
- C. Determination of the cause of the failures and anomalies and the identification of corrective actions to be undertaken for subsequent missions.

III. REPORTING REQUIREMENTS

- A. Flight evaluation reporting shall be prepared by the Centers (MSFC, MSC, KSC) in accordance with the general requirements in references (a) and (b). The following summarizes these requirements and identifies the minimum report contents as well as Center responsibilities for the contents:

Enclosure 3

June 6, 1966

1. Twenty-four hour Flash Report (Mission Director)

This report is required by the Mission Operations Director and issued by the Mission Director and will contain such data as launch and recovery time, statement of success based on general purpose, and listing of any observed significant anomalies of the flight and launch active ground support hardware.

2. Daily Operations Report (Mission Director)

For long duration manned Apollo flight missions there shall be a Daily Operations Report as required by the Mission Operations Director and issued by the Mission Director, which shall include major event chronology, and mission failure and anomalies identification.

3. Three-day Report (KSC, MSFC, MSC)

For Apollo flights each Center shall supply a teletype report to the Apollo Program Director within three days after the launch of the flight. In the case of manned missions the MSC report shall be issued three days after mission completion. For the Centers specified, the data shall contain the following information:

a. KSC Report

Space vehicle pre-launch checkout and final count-down anomalies summary, initial post launch complex status evaluations, and data retrieval status.

b. MSFC Reports

Identification and indication of the degree to which each of the launch vehicle objectives have been satisfied, identification of major launch vehicle trajectory results including comparison with predicted conditions. The report shall also identify launch vehicle failures and anomalies and the possible causes.

c. MSC Report

The report will contain an identification and indication of the degree to which each of the spacecraft objectives have been satisfied,

identification of major spacecraft trajectory results including comparison with predicted conditions. The report shall also identify spacecraft failures and anomalies and the possible causes.

4. Ten-day Reports (MSFC, MSC)

For all Apollo flights, MSFC shall supply a teletype report within 10 days after launch. MSC will supply a teletype report 10 days after launch for unmanned flight and 10 days after mission completion for manned flights. These reports will be submitted to the Apollo Program Director and will update the applicable Center three-day reports and will include new anomalies and failures identified, their causes and possible failure modes.

5. Failure and Anomalies Listing Report (KSC, MSFC, MSC)

Within 30 days after launch MSC, MSFC, and KSC shall provide to the Apollo Program Director for each mission as applicable to Center responsibilities a listing of all significant flight and launch anomalies including significant malfunctions, performance deviations, and system, subsystem, or hardware failures. In the case of manned missions, the MSC listing is due 30 days after mission completion. As a minimum requirement the listing shall include the following:

- a. Identification of the failure or anomaly.
- b. The criticality of the anomaly and whether it had a primary or secondary effect on the mission in view of the mission objective.
- c. Identification of impact on next flight.
- d. Description of the failure or anomaly, identifying the system and hardware part (where appropriate), the time in the mission when the anomaly occurred, and the possible mode and cause of the failure or anomaly.
- e. Identification of prior qualification or certification ground test status, and prior checkout status of the part to determine whether anomaly or failure possibility was evident.

- f. Corrective action to be undertaken: This shall include the identification of any required redesign as well as modifications to the qualification or certification testing and checkout activities to ensure that the problem will not re-occur. In addition, the mission effectivity of the change and a statement of whether corrective action is resolved or remains unresolved is required. The anticipated close-out date for anomaly corrective action shall be identified.

The above listings shall be used as a baseline for identification of required part modifications and requalification requirements to follow-on flights. They are to be updated as required and information copies of the updates are to be transmitted to the Apollo Program Director.

This listing will also be included as a summary section of the Final Flight Evaluation Report identified in III.A.6 below.

6. Final Flight Evaluation Report (MSFC, MSC)

Final Flight Evaluation Report shall be prepared by MSFC and MSC as outlined in NPC 500-10 and shall be submitted within 45 - 60 days after the mission completion to the Apollo Program Director. As applicable to each Center the report shall include as a minimum requirement the following:

- a. Detailed description of spacecraft and launch vehicle configuration, mission trajectory, and sequential events description.
- b. Detailed results and analysis of spacecraft and launch vehicle system and subsystem performance.
- c. Apollo experiments results.
- d. Recovery operations.
- e. The separate summary section report listing of the failures and anomalies outlined previously in III.A.5.

7. Ground Systems Evaluation Report (KSC)

A Ground Systems Evaluation Report shall be prepared by KSC and shall be submitted within 45 - 60 days after the mission completion to the Apollo Program Director. The report shall include as a minimum the following:

- a. A chronological summary of major KSC flow events leading to the launch.
- b. Atmospheric conditions.
- c. Ground system performance and condition for next flight.
- d. Summary list of significant launch anomalies and failures and their corrective actions.

8. FRR and DCR Documentation

For the subsequent Flight Readiness Review (FRR) that occurs, and for the applicable Design Certification Review (DCR), the updated anomalies listings identified in III.A.5 are to be analyzed to determine the adequacy of the actions taken relative to the next mission. This effort is to be submitted as part of the FRR Part I and the applicable DCR documentation. The results are to be summarized and presented as part of the oral presentations at the Apollo Program Director's Part I FRR established by Reference (c) and, where applicable, to the Apollo DCR, as established by Reference (d).

IV. PRESENTATIONS

- A. Preliminary results of the flight are to be summarized at the Management Council meeting following the flight. The presentation should be by the Center Program Managers, if the Centers are presenting status, otherwise it would be included in the Apollo Program Office presentation.
- B. Approximately five weeks after completion of the flight mission, on a date chosen by the Apollo Program Director (MA), the Centers (MSFC, MSC, KSC) shall make a presentation to the Panel Review Board (PRB) based on Flight

Evaluation Panel findings and current in-house activities. The review shall cover as a minimum the following information:

1. A report on the degree to which mission objectives had been satisfied.
2. Trajectory events evaluation.
3. Description of major resolved and unresolved anomalies including data as described in the Anomalies Listing.
4. An identification of major hardware changes and of checkout changes being processed by internal Center change procedures resulting from post flight results.
5. Status report on post flight testing.

V. CONTINGENCY PLAN

In the event of premature or unsuccessful termination of an Apollo Mission the requirements for security, investigation procedures, data handling, and reporting will be those established in Reference (e).

VI. ACTION

This Directive shall be implemented immediately for reporting the results of Apollo flights and to ensure that identification of flight and launch anomalies and suitable corrective actions have been taken.

ENCLOSURE 2

MA APOI 1410.2 REVISION A

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MM/Bollerud

PT/Maggin (2)
SM/Foster (4)
SL/O'Bryant
TN/Brockett

CENTERS:

MSFC/von Braun (Director)
MSFC/Mrazek (R-R&VE)
MSFC/O'Connor (I-DIR)
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MSFC/Rudolph (I-V-MGR)
MSFC/Belew (I-E-MGR)
MSFC/Hans Maus (E-DIR)
MSFC/Data Manager (95)
(R. Boldston, I-RM-M)

MSFC/F. Speer (I-MO-MGR)
MSFC/Flight Evaluation Board
J. Lindberg (R-AERO) (20)

MSC/Gilruth (Director)
MSC/Shea (PA)
MSC/Paget (EA)
MSC/Kraft (PA)
MSC/Data Manager (60)
H. Bullock, PP-2)
MSC/Piland (EX)
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B. McCann (20)

KSC/Debus (Director)
KSC/Petrone (PPR)
KSC/McCoy (PPR-1)
KSC/Greenglass (PPR-3)
KSC/Mathews (PPR-4)
KSC/Clearman (PPR-5)
KSC/Preston (DIO)
KSC/Data Manager (60)
(A. Harper, PPR 33)